

CLAIMS:

1. A polyaxial fixation device, comprising:  
a shank having a spherical head formed on a proximal end thereof;  
a receiver member having an axial passage formed therein and adapted to polyaxially seat  
5 the spherical head of the shank; and  
an engagement member adapted to provide sufficient friction between the spherical head  
and the receiver member to enable the shank to be maintained in a desired angular orientation  
before locking the spherical head within the receiver member.
- 10 2. The device of claim 1, wherein the engagement member comprises a ring member  
positioned to frictionally engage a portion of the spherical head.
3. The device of claim 2, wherein the ring member is disposed within a groove formed  
around one of an inner surface of the receiver member and an outer surface of the spherical head  
15 of the shank.
4. The device of claim 3, wherein the groove has a depth that is equal to or greater than a  
thickness of the ring member to allow the ring member to be completely disposed within the  
groove.
- 20 5. The device of claim 3, wherein the ring member is adapted to expand or contract to be  
completely disposed within the groove.
6. The device of claim 2, wherein the ring member has an irregular shape.
- 25 7. The device of claim 2, wherein the ring member is substantially C-shaped.
8. The device of claim 2, wherein the ring member includes an opening formed in a wall  
thereof to allow the ring member to expand.
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9. The device of claim 1, wherein the engagement member comprises a collet having a plurality of spaced, expandable members disposed therearound and adapted to engage the spherical head of the shank.

5 10. The device of claim 9, wherein the collet is at least partially disposed within a groove formed around an inner surface of the receiver member.

10 11. The device of claim 1, wherein the engagement member comprises a compression cap disposed within the receiver member and having a concave distal surface adapted to seat at least a portion of the spherical head of the shank, the compression cap being matable with the receiver member such that the compression cap is effective to retain the spherical head of the shank in a spherical recess formed in the receiver member.

15 12. The device of claim 11, wherein the compression cap includes opposed leaf-spring members, and wherein the receiver member includes opposed deformable portions that, upon deformation, are effective to contract the leaf-spring members to cause the compression cap to frictionally engage the spherical head of the shank.

20 13. The device of claim 11, wherein at least a portion of the compression cap has a diameter that is expandable or deformable to frictionally engage the spherical head.

25 14. The device of claim 13, wherein the compression cap includes a plurality of distally-extending finger-like members formed around a distal edge of the compression cap and adapted to frictionally engage the spherical head.

15. The device of claim 13, wherein the compression cap includes at least one longitudinally oriented slot formed therein to allow the compression cap to be contracted to frictionally engage the spherical head.

30 16. The device of claim 14, wherein the concave distal surface of the compression cap has an inner radius that is less than a radius of the spherical head to allow the compression cap to

frictionally engage the spherical head when the compression cap is retained within the receiver member.

17. A polyaxial fixation assembly, comprising:

a shank having a spherical head formed on a proximal end thereof;

a receiver member having a first, proximal opening adapted to receive a spinal fixation rod and a second, distal opening having a diameter sized to permit passage of the shank therethrough while maintaining the spherical head therein, the receiver member further including a spherical seat adjacent the second, distal opening to polyaxially seat the spherical head of the shank; and

means for frictionally engaging the spherical head to maintain the shank in a desired angular orientation such that a force greater than a frictional engagement force is required to change the angular orientation of the shank with respect to the receiver member.

18. The polyaxial fixation assembly of claim 17, wherein the means for engaging the spherical head comprises a ring member positioned to frictionally engage a portion of the spherical head.

19. The polyaxial fixation assembly of claim 18, wherein the ring member is disposed within a groove formed around one of an outer surface of the spherical head of the shank and an inner surface of the receiver member.

20. The polyaxial fixation assembly of claim 19, wherein the groove has a depth that is equal to or greater than a thickness of the snap ring to allow the snap ring to expand or contract completely into the groove.

21. The polyaxial fixation assembly of claim 19, wherein the ring member is adapted to expand or contract to be completely disposed within the groove.

22. The polyaxial fixation assembly of claim 18, wherein the ring member has an irregular shape.

23. The polyaxial fixation assembly of claim 17, wherein the means for engaging the spherical head comprises a collet having a plurality of expandable members disposed therearound and adapted to engage the spherical head of the shank.

24. The polyaxial fixation assembly of claim 23, wherein the collet is at least partially disposed within a groove formed around an inner surface of the receiver member.

25. The polyaxial fixation assembly of claim 17, wherein the means for engaging the spherical head comprises a compression cap disposed within the receiver member and having a concave distal surface adapted to seat at least a portion of the spherical head of the shank, the compression cap being matable with the receiver member such that the compression cap is effective to retain the spherical head of the shank in the spherical seat in the receiver member.

26. The polyaxial fixation assembly of claim 25, wherein the compression cap includes opposed leaf-spring members, and wherein the receiver member includes opposed deformable portions that, upon deformation, are effective to contract the leaf-spring members toward one another to cause the compression cap to frictionally engage the spherical head of the shank.

27. The polyaxial fixation assembly of claim 25, wherein at least a portion of the compression cap has a diameter that is expandable or deformable to frictionally engage the spherical head.

28. The polyaxial fixation assembly of claim 27, wherein the compression cap includes a collet portion with a plurality of distally-extending finger-like members formed around a distal edge of the compression cap and adapted to frictionally engage the spherical head.

29. The polyaxial fixation assembly of claim 27, wherein the compression cap includes at least one longitudinally oriented slot formed therein to allow the compression cap to be contracted to frictionally engage the spherical head.

30. The polyaxial fixation assembly of claim 28, wherein the concave distal surface of the compression cap defines an inner radius that is less than a radius of the spherical head to allow the compression cap to frictionally engage the spherical head when the compression cap is retained within the receiver member.

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31. The polyaxial fixation assembly of claim 17, wherein the means for engaging the spherical head comprises a surface coating disposed on at least a portion of the spherical head of the shank and effective to create friction between the spherical head and the receiver member.